Examining the Recent Behavior of Inflation

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DURING the past few years, the rate of inflation has declined dramatically. From its peak of 16.70 percent in I/1980, inflation, as measured by changes in the consumer price index (CPI), fell to a low of 0.32 percent in I/1983. Although the inflation rate has increased somewhat to 4.34 percent in the first half of 1984, it continues to be low relative to rates for the past decade.

The actual behavior of recent inflation contrasts sharply with "monetarist" forecasts of inflation that rely heavily on the behavior of past money growth for their predictions.[1] The divergence between such inflation forecasts and actual inflation has led some analysts to question the usefulness of a narrow, transactions measure of money as an indicator of future economic activity.

The purpose of this article is to examine some of the reasons for the recent decline in the observed inflation rate. In this regard, we will investigate the impact of recent changes in food and energy prices on the observed rate of inflation. Because these two categories are most often cited as the major culprits in the 1973–74 and 1979–80 bursts of inflation, we will examine the role they have played in the recent disinflation.

In addition, we will assess the claim that the trend growth in a transactions measure of money provides a good measure of the underlying inflation rate; that is, the rate to which observed inflation would tend in the absence of exogenous shocks to individual commodity prices. To do this, we will investigate the relationship between current inflation and two measures of trend money growth: one measure based on published M1 data, the other accounting for the distorting effects of recent financial innovations.

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[1]For example, Hafer (1983) forecasted the rate of inflation for 1983, 1984 and 1985 to be 6.59 percent, 7.25 percent and 7.17 percent, respectively, based on an equation that uses only past money growth to predict inflation. These forecasts assumed that the trend in money growth, measured as a distributed lag over three years, would remain at its I/1983 rate of 7.5 percent. By II/1984, this trend rate actually had increased to 8.09 percent.

THE RATE OF INFLATION VS. CHANGES IN THE PRICE LEVEL: SOME KEY DIFFERENCES

Inflation is defined as a persistent increase in the *general level* of prices of goods and services. The crucial distinction is that the general level of prices, not just one or two individual prices, must rise over time. Of course, observed rates of inflation are measured by changes in an *index* of prices. These indexes, for example the CPI, represent a weighted average of prices covering a variety of goods and services. From month to month, some of these individual prices will be rising while others are falling. Because these relative price movements are weighted differently in the index, changes in the overall index, which are used to measure inflation, may reflect nothing more than the changes in certain individual prices that are weighted more heavily than others. Thus, such descriptions as "the jump in inflation last month stems from an increase in food prices," although commonly reported, are essentially wrong. Indeed, rather than describing a persistent increase in the general level of prices, statements of this type merely describe a temporary phenomenon — a transient increase in the price index caused by an increase in the relative price of an individual commodity that has a relatively large weight in the index.[2]

It generally is agreed that a persistent increase in the price level occurs only when aggregate demand continues to grow faster than aggregate supply. Because there is considerable evidence that the main determinant of aggregate demand growth over time is the growth of the money supply, it has become widely accepted that "Inflation is always and everywhere a monetary phenomenon."[3]

Since changes in aggregate demand over time are mainly determined by money growth, a useful measure of the underlying or monetary-induced rate of inflation is the trend, or longer-run average rate of money growth. Movements in trend money growth, while not accurate for forecasting *short-term* inflation rates, are useful because they point to the *direction* of the longer-run movement of prices that is more appropriately termed "inflation." Indeed, during the 1960–84 period, the average rate of inflation (5.34 percent) is not statistically different from the average rate of money growth (5.69 percent).[4] When the quarter-to-quarter changes in prices and money are compared, however, the simple correlation is only 0.15. Thus, even though money growth and inflation are not related closely over intervals as short as one quarter, they are related very closely over longer time periods.

Deviations of Inflation from Trend Money Growth

Deviations of observed inflation rates from trend money growth reflect the impact of transitory factors on the price index. To see this, consider the stylized world depicted in figure 1. The underlying rate of inflation consistent with the trend rate of money growth is shown in panel B of figure 1 as the slope of line AB. At time t_0, however, a random shock occurs; for example, a sharp decline in OPEC oil prices. At this point, the observed price index drops from B to C in panel A. If the economy could adjust instantaneously and costlessly to this new environment, inflation would continue from t_0 at the previous rate: the slopes of lines AB and CE are identical.

In the real world, however, adjustments to changes in relative prices are costly and the adjustment process takes time. This period of complete adjustment is depicted in figure 1 by the span between t_0 and t_1. During this time, the overall price index increases from B to D and, since the slope of BD is less than CE, *gives the appearance* that the decline in the price of oil has caused the inflation rate to decrease. In fact, this phe-

[2]As of December 1983, food prices accounted for 18.74 percent of the index. For discussions of the sensitivity of price indexes to relative price movements in general, see Blinder (1980, 1982) and Davidson (1982). For a specific investigation of the role of food prices, see Belongia (1983).

[3]Friedman (1970), p. 24. This observation stems from the relationship captured in the quantity theory equation of exchange. In growth rate form, the equation is written as:

$$\dot{M} + \dot{V} = \dot{P} + \dot{Q},$$

where M is the money stock, V is velocity, P is the price level, Q is the level of output, and the dots over the letters denote rates of change. According to the theory associated with this specification, velocity and output, in the long run, are determined independently of money growth; thus, $\dot{V}$ and $\dot{Q}$ can be viewed as constants. The consequence of this notion is that changes in the growth of money, in the long run, will be reflected directly and one-for-one in changes in the rate of inflation.

[4]The calculated t-statistic to test the null hypothesis that these mean rates are equal is 0.67. Thus, we cannot reject the null hypothesis at any reasonable level of significance. Interestingly, this relationship holds even for the 1970s. The average rate of inflation is 7.38 percent, and the average rate of M1 growth is 6.57 percent. The calculated t-statistic from this comparison is only 1.31. This suggests that the supply shocks of the 1970s did not affect the underlying rate of inflation, but merely generated substantial short-run deviations of the observed inflation rate from the trend rate of money growth.

The relationship between money growth and inflation is examined in a vast amount of research, examples of which are Friedman and Schwartz (1963, 1982), Meiselman (1970), Carlson (1980), Karnosky (1976), and Bordo and Choudhri (1982).

Figure 1
Effect of Transitory Nonmonetary Shock on the Trend Rate of Inflation

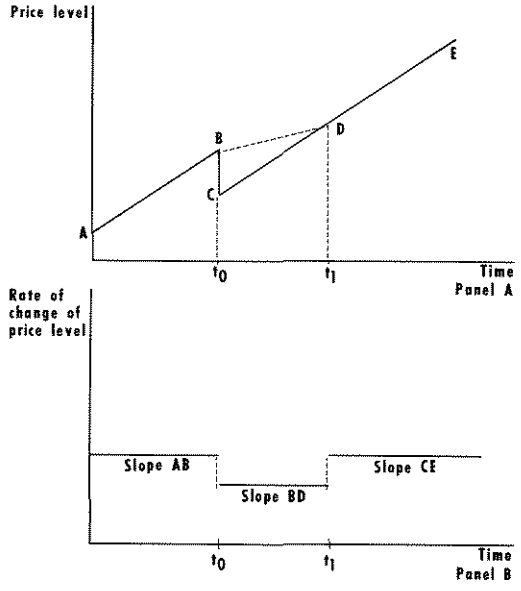
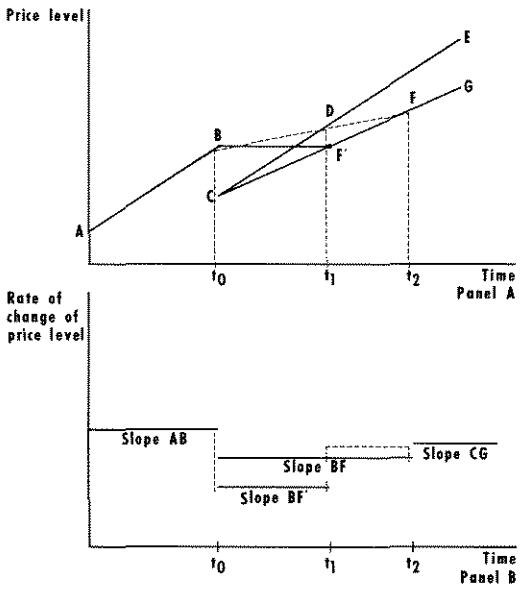


Figure 2
Effect of Transitory Nonmonetary Shock and Change in Trend Money Growth on the Trend Rate of Inflation



nomenon is only temporary and, beginning in t_1, observed inflation returns to the rate determined by the trend of money growth.

What happens if this type of relative price decline occurs simultaneously with a decline in the underlying inflation rate? These joint effects are captured in figure 2. As in figure 1, the underlying inflation rate equals the slope of AB until, at time t_0, there occurs a relative price-induced decline in the price index. Also at time t_0, the trend of money growth is reduced. This latter development, other things equal, lowers the underlying inflation rate to the slope of the line CG, which is less than the slope of AB. Note that the rate of inflation is lower than before, when there was only a relative price decline (slope BDF is less than slope AB).

Suppose that the adjustment is completed by time t_1, indicated by line segment BF'. This possibility suggests a much sharper decline in observed inflation (see panel B) and a shorter period of adjustment ($t_2 - t_0 > t_1 - t_0$). The impact of a lower trend in money growth also is reflected by the fact that, once the new underlying rate of inflation is reached at time t_2, prices rise at a slower rate than before the shock (slope CG is less than slope AB).

To summarize, inflation is a persistent increase in the overall price level. This persistence is associated directly with the average long-run rate of money growth. As discussed above, however, random shocks that affect individual prices (and which are unrelated to money growth) may cause the observed inflation rate to temporarily rise above or fall below the underlying inflation rate which corresponds to trend money growth.

THE EFFECTS OF RELATIVE PRICE CHANGES IN THE 1970s: SOME EVIDENCE

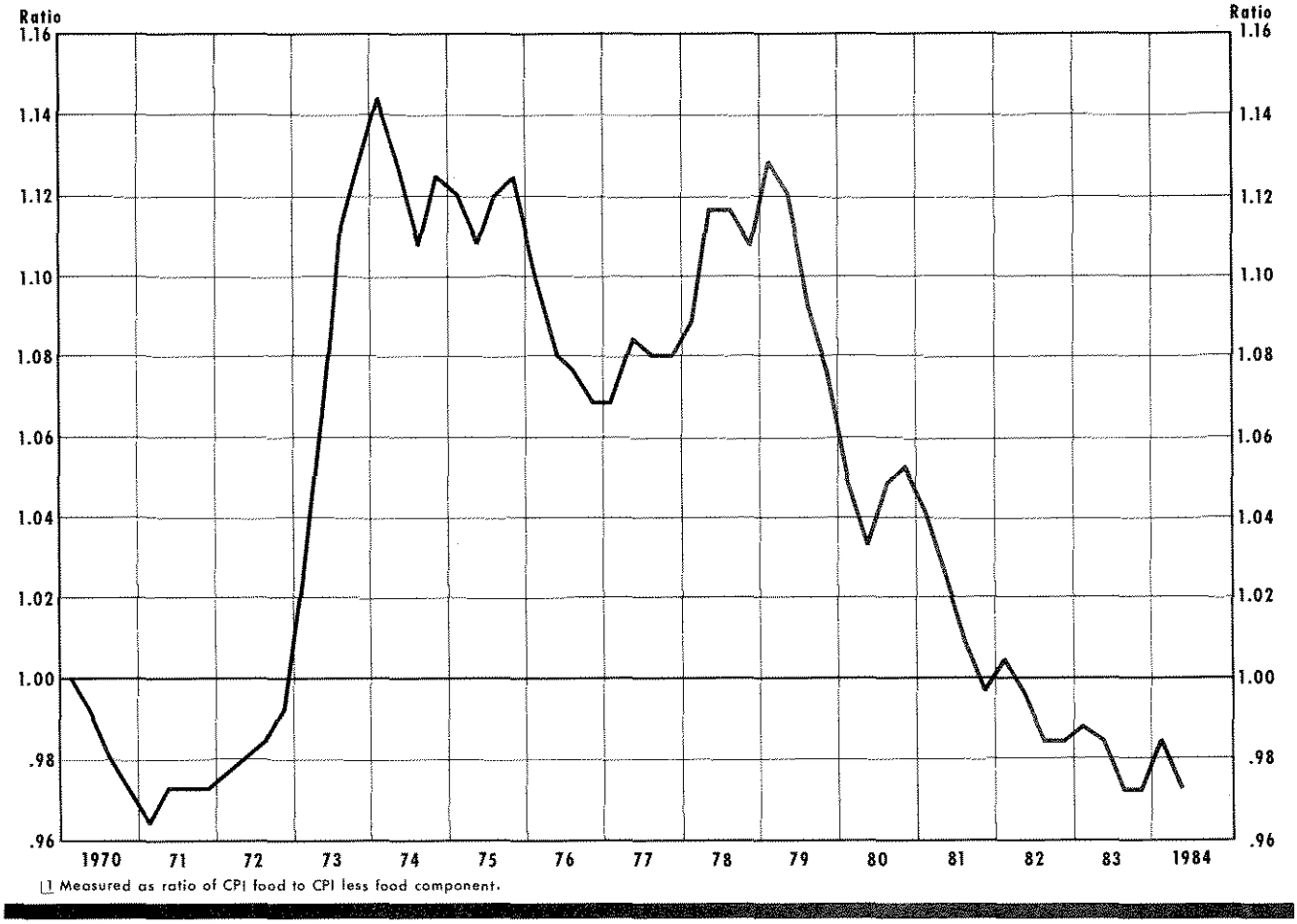
A substantial literature has evolved to explain the behavior of inflation during the 1970s.[5] It generally is agreed that exogenous supply shocks to the economy accounted for a substantial amount of the observed inflation phenomenon. The two most widely discussed supply-side factors have been the behavior of food prices and, perhaps better known, the impact of oil price changes.[6]

[5]See Blinder (1982), Rasche and Tatom (1981), Tatom (1981), Fischer (1981) and Gordon (1977).

[6]The Nixon price controls of 1971–74 also had the effect of artificially reducing the observed rate of inflation. Indeed, Blinder (1982), p. 267, demonstrates that the imposition and removal of wage and price controls altered the time path of price changes: "lowering inflation when it would otherwise have been low (especially in 1972) and raising inflation when it would otherwise have been high (especially in 1974)." See Blinder and Newton (1981) for a more detailed analysis of the wage and price controls' effect on inflation.

Chart 1

Relative Price of Food [1]



[1] Measured as ratio of CPI food to CPI less food component.

Food Prices

The behavior of the food price component of the CPI during the past decade is shown in the second column of table 1. Note the dramatic rise in food prices in 1973, increasing at a 19.4 percent rate compared with a 5.0 percent rate only a year earlier. This jump in food prices accounts for a sizable portion of the observed increase in the CPI between 1972 and 1973. Estimates by Blinder (1982), for example, suggest that increases in food prices alone accounted for nearly 5 percentage points of the measured inflation rate between mid-1973 and mid-1975.

During the period 1977–78, food prices again increased rapidly, rising faster than the price index for all items except food. Excluding food prices from the CPI, for instance, yields an inflation rate of 6.38 percent in 1977 and 8.43 percent in 1978, compared with rates of inflation of 6.65 percent in 1977 and 8.94 percent in 1978 using the overall CPI. This comparison suggests that increases in the relative price of food directly accounted for about one half of one percentage point of the observed inflation rate by 1978.

To see the change in food prices relative to all other goods during these periods, chart 1 plots the ratio of the index of food prices to the index of all other prices in the CPI from I/1970 to II/1984. Note that, beginning in late 1972, the price of food items began to rise more

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Table 1
Rates of Inflation

Year	CPI	Food	Energy	CPI less Food/Energy
1970	5.67%	3.45%	4.00%	6.46%
1971	3.51	3.65	3.54	3.41
1972	3.42	5.02	3.15	2.97
1973	8.35	19.36	12.94	4.55
1974	12.14	12.02	25.49	10.90
1975	7.37	7.25	11.25	6.96
1976	5.07	1.16	6.76	6.44
1977	6.65	7.43	9.21	6.21
1978	8.94	11.42	7.52	8.44
1979	12.66	9.93	36.47	10.66
1980	12.51	10.27	18.86	12.15
1981	9.57	4.93	12.59	10.24
1982	4.48	3.26	1.92	5.19
1983	3.30	2.26	−1.25	4.26
1984	4.34	4.80	0.11	4.96

NOTE: All rates measured as fourth quarter to fourth quarter, except 1984 which is measured to second quarter.

rapidly than all other items in the CPI: from IV/1972 to I/1974, this ratio increased from 0.99 to 1.14. During the 1974–76 period, food prices increased more slowly than the prices of other goods and services, as reflected in the decline in the ratio to a value of 1.07 in IV/1976. Again in 1977 through 1979, food prices relative to all others increased more rapidly. This is shown by the rise in the ratio from 1.07 in I/1977 to 1.13 in I/1979.

Energy Prices

The most often discussed culprit for the temporary bursts of inflation during the past decade has been the increase in the relative price of energy. To provide some perspective, energy prices increased at an average annual rate of only 1.20 percent during the 1960s. The average annual increase in the energy price component of the CPI has been almost 11 percent since 1970.

The effects of the two surges in energy prices on the observed rate of inflation have been well documented.[7] As shown in table 1, the energy price component of the CPI rose dramatically from 1973 through 1975, with the major boost coming in 1974 when energy prices increased at a 25.49 percent rate. Indeed, researchers have found that the direct and indirect effects of the energy price increase in 1974 raised the observed rate of inflation by 2 to 4 percentage points in 1974 and by a slightly smaller amount in 1975, depending on the price index used.[8]

Energy prices rose sharply again in 1979 and continued to increase through 1981: the 36.47 percent increase in 1979 was substantially larger than the increase in 1974. And, because the relative weight on energy items in the CPI has increased since the early 1970s, increases in energy prices today have a relatively more important effect on the overall change in the level of the CPI.[9]

To illustrate how the relative energy price increases affected inflation, chart 2 plots the ratio of the index of energy prices to the index of all other items in the CPI. The rapid increases in the relative price of energy in 1973–74 and again in 1979–80 are clearly noticeable in the chart. Furthermore, as was the case for the relative food price increases, these relative price changes are of short duration. Indeed, from 1975 through 1978, the relative price of energy showed little change, indicating that energy prices were increasing no faster than other prices.

The combined effects of the food and energy price shocks can be seen by stripping the CPI of these components and recalculating the inflation rate. This rate of inflation is reported in the final column of table 1.[10] Increases in the food and energy components of the CPI directly accounted for almost 4 percentage points of the observed inflation rate in 1973. In 1974 and 1975, these two components directly raised the CPI inflation rate by 1.24 percentage points and 0.4 percentage points, respectively. Of course, these figures do not capture the indirect influence of these components as higher energy prices influenced manufacturing, transportation, heating and other costs of production.

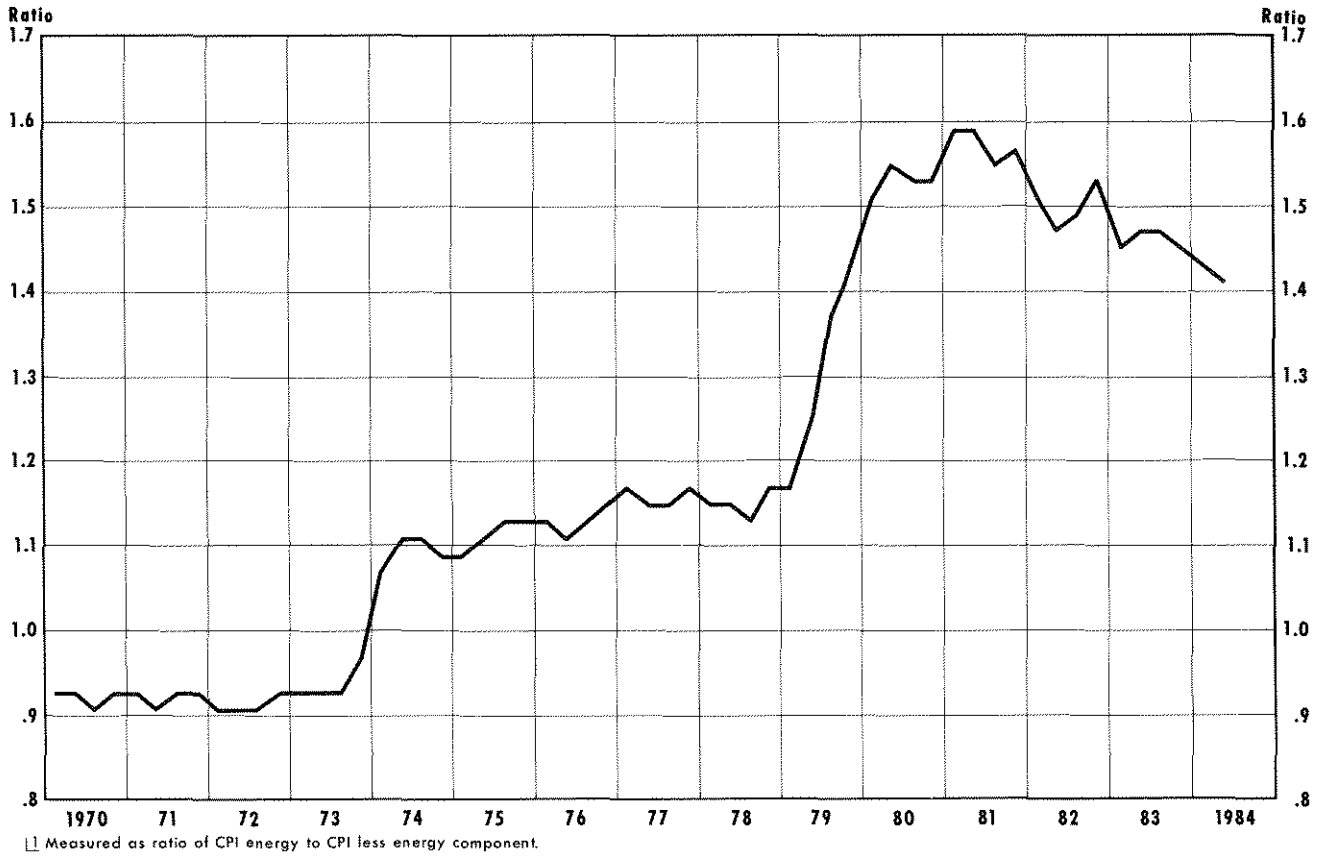
[7]See references cited in footnote 4.

[8]Blinder (1979), using the personal consumption expenditure (PCE) deflator reports that the direct effect of the increased energy prices in 1973–74 was to raise the PCE deflator's inflation rate by 2.4 percent. Tatom (1981) reports that energy price changes in 1974 contributed almost 4 percentage points to the inflation rate using the GNP deflator.

[9]Blinder notes that the relative importance of the energy component of the CPI has increased since 1973. The "relative importance" of the energy component increased from 0.065 in 1973 to 0.10 during the 1979–80 energy price shock. See Blinder (1982), footnote 8 for a useful discussion.

[10]This rate of inflation is sometimes referred to as the "base" rate of inflation.

Chart 2
Relative Price of Energy [1]



[1] Measured as ratio of CPI energy to CPI less energy component.

To see the degree to which food and energy price developments influenced the measured rate of inflation in 1979–80, look again at the inflation rate measured using the CPI less food and energy index. This inflation rate, compared with the overall CPI rate, suggests that food and energy price rises in 1979 directly accounted for 2 percentage points of the increase, and the indirect effects continued to work through the price system in 1980 and 1981.

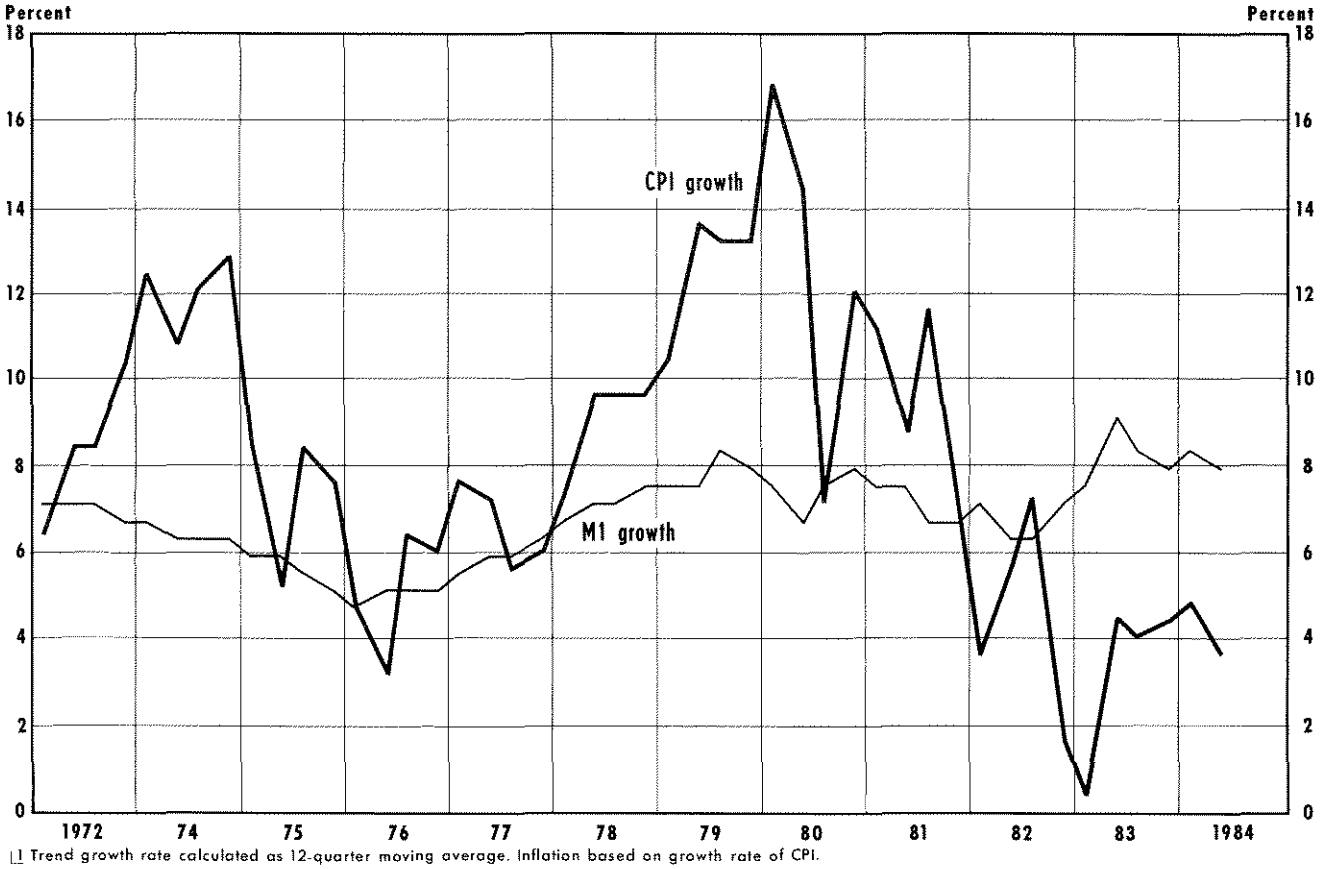
RELATIVE PRICE EFFECTS AND THE RECENT DISINFLATION

Food price increases recently have declined from the lofty rates registered from 1977 through 1980. During the past few years, food prices have increased at a slower rate than that of all other items. This is evident in table 1 and in the decline in the ratio of food prices to other CPI items plotted in chart 1. For example, food prices increased at an average rate of 3.70 percent for the period 1981–84. The average rate of inflation for the CPI less food during the same period is 6.00 percent. Thus, the recent decline in the relative price of food has contributed to the drop in the observed rate of inflation, just as increases in the relative price of food helped raise the observed inflation rate during the 1970s.

In contrast to the behavior of energy prices during the 1970s, energy prices also have increased much less rapidly in the past few years. In fact, relative to all other prices, energy prices have fallen since mid-1981 (see chart 2). For example, after increasing at a 12.59 percent rate in 1981, the energy price component of the CPI increased at only a 1.92 percent rate in 1982 and, in 1983, actually *declined* at a 1.25 percent rate. Indeed, this recent decline in energy prices is the first since 1964.

Chart 3

Trend Growth Rate of M1 and Inflation [1]



[1] Trend growth rate calculated as 12-quarter moving average. Inflation based on growth rate of CPI.

These declines in the relative prices of energy and food help explain some of the recent reduction in measured inflation. As shown in table 1, during 1981–84, deleting food and energy prices from the CPI results in an inflation rate that is *greater* than that measured with the CPI. In other words, during 1981–84 the direct effects of declines in the relative prices of food and energy were to reduce the observed rate of inflation by an average of 0.74 percentage points. Thus, in contrast to the 1973–74 and 1979–80 episodes when food and energy prices temporarily pushed the observed rate of price increase upward, large declines in these relative prices during the past few years have helped reduce the observed rate of inflation. Consequently, just as commentators in the 1970s sought to measure a lower "baseline" rate of inflation by removing the effects of food and energy, recent observed rates of inflation have been understated partly because of food and energy price behavior.

MONEY AND INFLATION

The previous discussion suggested that the trend rate of money growth and the underlying rate of inflation are related directly. It is useful, therefore, to compare the observed rate of inflation over time with the trend rate of money growth. This comparison is shown in chart 3 where the CPI inflation rate is plotted along with the trend of M1 growth for the period 1973–84.[11]

The major supply shocks discussed above again are evident in this chart as the inflation rate soars above trend money in the mid- and late-1970s. These episodes reflect the fact that trend money approximates the underlying rate of inflation and cannot be used to explain short-run movements of the inflation rate. That is, trend money growth provides a reference point from

[11] Trend money growth is measured as a 12-quarter moving average.

which inflationary developments can be judged; the inflation rate presumably moves back toward the trend money growth once temporary supply shocks have dissipated. This is apparent in the drops of measured inflation during 1975–77 and again following the 1979–80 inflation bulge.

Recently, however, concern has been voiced about the large divergence between trend money and the inflation rate. In 1981, trend money averaged about 7.17 percent and the quarterly inflation rate averaged 9.59 percent. Since 1982, however, the situation has reversed with the trend of money growth substantially above the inflation rate: inflation averaged 4.48 percent in 1982 and trend money growth averaged 6.81 percent. In 1983, the difference widened with trend money growth averaging 8.35 percent while the average inflation rate was only 3.30 percent. And, thus far in 1984, trend money growth has averaged 8.16 percent, compared with an average inflation rate of 4.34 percent. Some argue that these divergences support the arguments against using a narrow monetary measure as a primary variable in formulating economic policy. Others argue that the recent divergence is a function purely of recent relative price distortions and that the inflation rate will soon return to the level of trend money growth, about 8 percent.

Trend Money Growth and Inflation: A Closer Look at the Recent Data

To examine the foregoing arguments, chart 3 is altered in two ways. The first change is somewhat controversial: it amounts to plotting a trend money growth line based not on published M1 figures, but on a measure (called MQ) that weights the components of M1 plus money market deposit accounts and money market mutual funds according to their use in transactions. In this measure, M1 components that have savings characeristics are given less weight in calculating the growth of money while some of the M2 components with transactions characteristics are added in. In other words, this alternative measure attempts to account for the "transactionsness" of these components.[12]

Table 2
Money Growth Rates: M1 and MQ

Period	M1	MQ
I/1980	7.35%	8.31%
II	−4.32	−4.07
III	16.87	15.31
IV	10.87	9.18
I/1981	4.66	−7.58
II	8.19	4.74
III	3.14	2.65
IV	4.67	4.65
I/1982	10.67	7.80
II	2.19	0.79
III	6.26	5.79
IV	16.28	14.92
I/1983	13.38	9.78
II	12.14	8.76
III	9.79	7.58
IV	4.91	3.71
I/1984	7.35	6.08
II	6.35	6.06

NOTE: Rates are compounded annual rates of change.

This change is very important in calculating the trend of money growth, because it significantly reduces the rate of M1 growth during periods when new transactions accounts that pay explicit interest and which appear to have some savings-type characteristics were introduced into M1. To illustrate the differences between these series, table 2 presents the quarterly growth rates of M1 and MQ for the period I/1980 to II/1984.

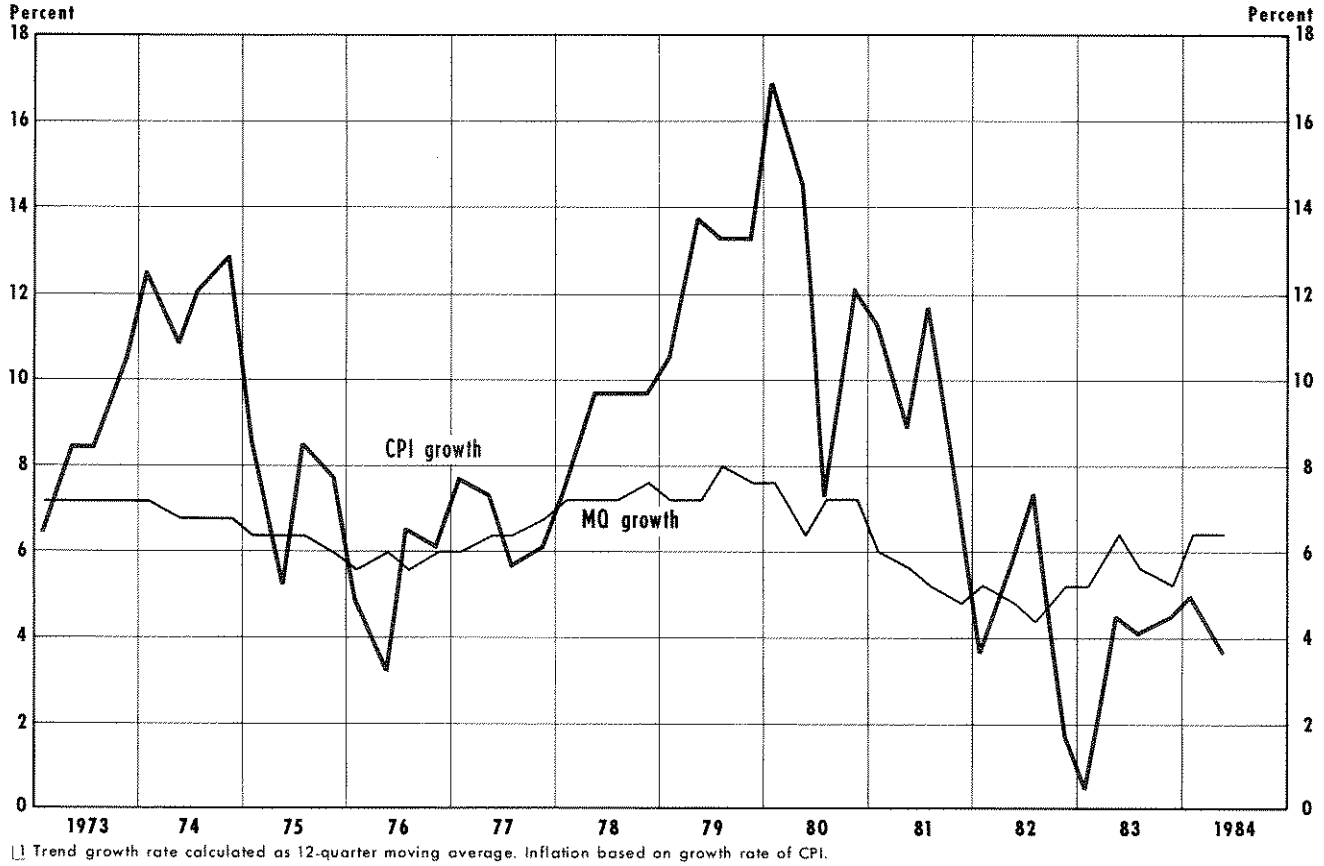
As table 2 reveals, there is a substantial increase in the growth of M1 in early 1981 and in late-1982 and early-1983. For example, during the first two quarters of 1981 when NOW accounts were made available nationwide, M1 growth averaged 6.42 percent. The average of MQ growth during that period, in contrast, was a negative 1.42 percent. This difference is due to the fact that much of the inflow of funds into NOW accounts was not used actively in transactions but held more for savings purposes.[13]

[12]The measure used here is constructed in Spindt (1984). In developing his measure, Spindt compares the ability of M1 and MQ to explain economic activity. He notes that, "In general, MQ and the conventional aggregate M1 exhibit strikingly similar behavior. However, during episodes when the behavior of M1 is 'abnormal' relative to income and interest rates, MQ behaves differently from M1. During these periods, shifts in the velocity of MQ are not detectable." For another attempt to remove the effects of financial innovations on M1 and examine the resultant measure's relationship to GNP during the recent period, see Hafer (1984).

[13]This conclusion is supported by evidence presented in Radecki and Wenninger (1983), Johannes (1981) and Johannes and Rasche (1981). See also the discussion in Hafer (1984).

Chart 4

Trend Growth Rate of MQ and Inflation [1]



[1] Trend growth rate calculated as 12-quarter moving average. Inflation based on growth rate of CPI.

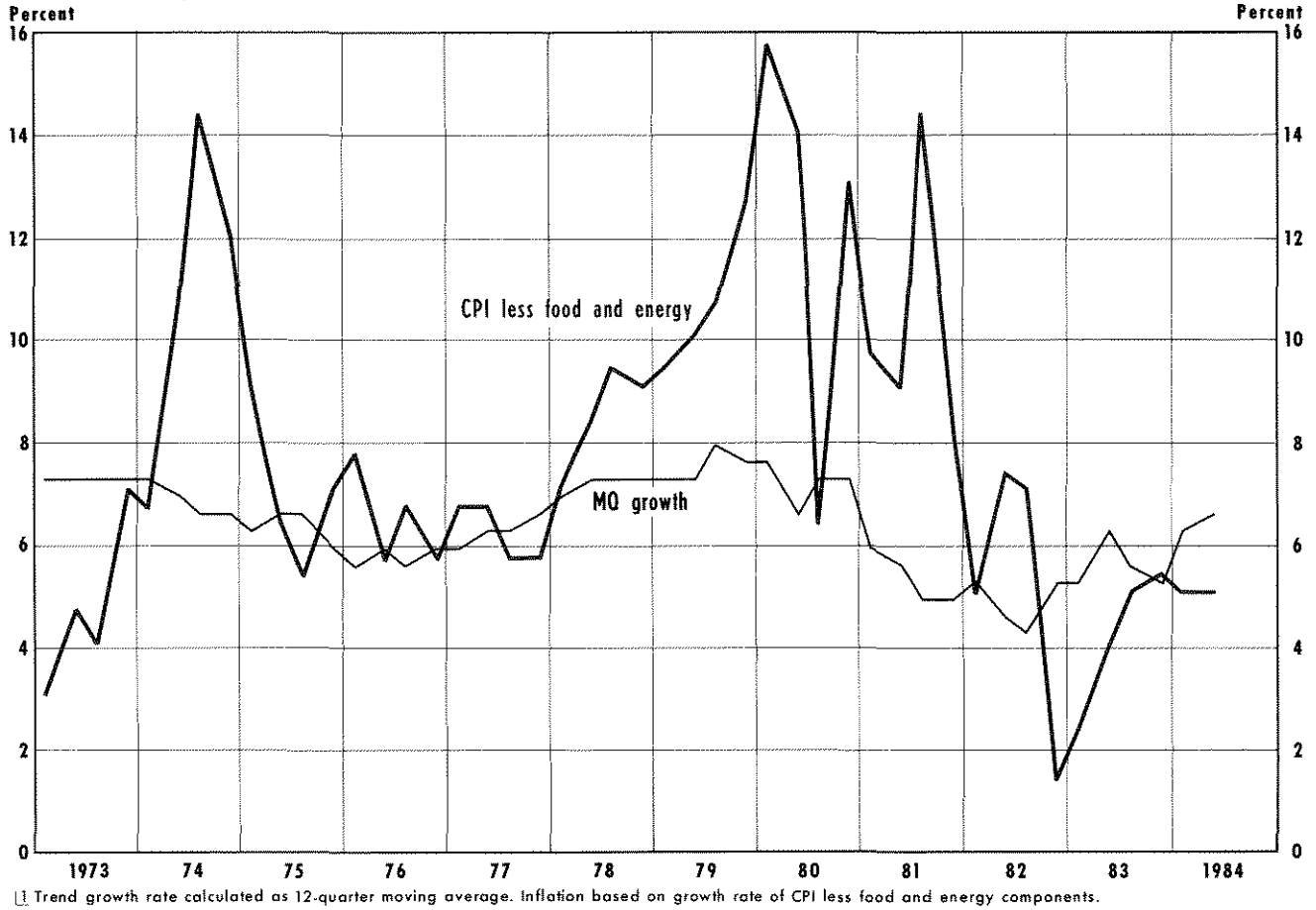
The two money growth rates differ substantially again in IV/1982 and I/1983, the time when the maturing of all-savers certificates and the introduction of Super-NOW accounts are thought to have imparted an upward bias to M1 growth.[14] During IV/1982, the growth of MQ is 1.36 percentage points less than M1. In both the first and second quarters of 1983, however, MQ growth is less than that of M1 by over 3 percentage points. Thus, these data suggest that the actual M1 figures may overstate the inflationary impact of recent trend money growth rates.

The outcome of using the MQ measure instead of M1 to construct trend money growth is illustrated in chart 4. There the MQ money growth trend is plotted with the CPI inflation rate. Note how the trend growth of MQ is lower than that of M1 since late 1980. Indeed, since 1980, the trend growth of MQ has averaged about 2 percentage points below that of M1. This lower trend is reflected in the closer relationship between recent inflation and trend MQ growth. For example, during the period I/1981 to II/1984, the trend rate of MQ growth was, on average, below the inflation rate by only 0.1 percentage points. Over the same time period, M1 trend money growth exceeded the inflation rate by an average of 2 percentage points. More recently, since the beginning of 1983, M1 trend money growth has been, on average, over 4.5 percentage points above the inflation rate; MQ trend money growth, in contrast, has averaged about 2 percentage points above the inflation rate. Thus, the evidence in chart 4 suggests that the recent divergence of inflation from trend money growth may be due to the overstatement of M1 growth stemming from recent financial innovations.

[14]The possibility of this occurring was given as one reason for temporarily abandoning M1 as the primary intermediate target variable in setting policy in October 1982.

Chart 5

Trend Growth Rate of MQ and an Alternative Measure of Inflation [1]



[1] Trend growth rate calculated as 12-quarter moving average. Inflation based on growth rate of CPI less food and energy components.

The second change to chart 3 is to plot the inflation rate measured by the CPI less food and energy components. This alteration allows us to illustrate the effects of recent relative energy and food price developments on the observed inflation rate and the relationship between inflation and trend money growth. Chart 5 combines the result of using MQ to measure trend money growth and measuring the inflation rate as the change in the CPI less food and energy components. The chart helps to illustrate how these factors explain the recently observed low rates of inflation.

First, the inflation rate based on all items in the CPI is less than the rate calculated using the CPI less food and energy from mid-1981 onward. During the past two years, this difference was as great as 2.18 percentage points (in I/1983). As of II/1984, the CPI less food and energy increased at an annual rate of 4.91 percent compared with a value of 3.70 percent using the complete CPI. Thus, the direct effect of recent energy price reductions along with slowing increases in food prices has been to lower the observed rate of inflation by more than 1 percentage point by the middle of 1984.

Second, as noted above, trend money growth based on the MQ measure is substantially lower than that for M1 since 1981. The importance of measuring trend money growth with the MQ measure is revealed by the fact that, once the recent relative price shocks have been accounted for, the rate of inflation is much more closely aligned with the MQ trend than with the trend of M1 growth. To the extent that the recent decline in inflation reflects the economic consequences of slow money growth, the recent recovery of inflation back toward the level of trend money growth (MQ) supports the belief that trend growth of transactions money

affects the temporal behavior of aggregate demand and, hence, has an important influence on inflation.[15]

CONCLUSION

Two conclusions emerge from this study. First, the recent decline in the observed rate of inflation measured by changes in the CPI is due, in part, to the decline in the relative price of food and energy. When these components are omitted from the overall measure of prices, the recalculated rate of inflation is almost 1 percentage point higher during the past two years. In other words, food and energy price developments during the past few years have served to temporarily lower the observed rate of inflation.

The second important finding is that trend M1 growth currently may be overstating the inflationary impact of recent monetary policy actions. An alternative transactions money measure, one that reduces the impacts of recent financial innovations, indicates the trend rate of money growth currently may be about 6.5 percent, instead of the 8 percent rate shown by the trend growth of M1. Thus, our results again indicate the importance of achieving and maintaining a low trend of money growth if the current low rates of inflation are to be maintained.

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[15]Others have sought to explain the decline in inflation as a function of lower wage demands, high rates of unemployment, excess capacity and a host of other "causes." While these forces, in fact, may account for some of the short-term behavior of observed inflation rates, these causes, like observed changes in the price index, are affected directly by aggregate demand and supply conditions in the economy. As such, they also reflect the underlying forces of monetary expansion or contraction. Thus, to cite these factors as "causes" of inflation is misleading. For recent examples of such analyses, see Englander and Los (1983), Kowalewski and Bryan (1984) or Stockton (1984). A critical discussion of this analytical approach is presented in Batten (1981).